

STATUS OF MOUNTAIN LION MANAGEMENT IN NORTH DAKOTA, 2011

North Dakota Game and Fish Department

November 2011

Time Period Covered:

1 July 2010 – 30 June 2011

SUMMARY

We used a combination of reports of occurrence, harvest locations, hunter and trapper questionnaires, and preliminary radiotelemetry investigations to determine the distribution of mountain lions in North Dakota. We examined abundance of mountain lions in relation to previous years (i.e. trend information) via these same methods, as well as previous habitat analysis. Additionally, we necropsied mountain lion carcasses to collect demographic, dietary, and genetic information. Results from the above investigations indicate a healthy population of mountain lions occurring in western North Dakota.

INTRODUCTION

Historically, mountain lions (*Puma concolor*) once ranged over most of North Dakota, although they were considered scarce except in the Badlands region (Bailey 1926). Records indicate mountain lions disappeared from North Dakota in the early-1900s (Bailey, Bell, and Brannon [1914] in Young and Goldman [1946]) with the last confirmed record of a mountain lion being harvested in 1902 along the Missouri River south of Williston (Bailey 1926). There has never been a bounty on mountain lions in North Dakota (McKenna et al. 2004). In 1961, Adams advised that mountain lions have the potential to show up in North Dakota, particularly the Badlands region. According to Seabloom et al. (1980), there were 10 reports of mountain lions in southwestern North Dakota between 1958 and 1980, and they felt the species should be considered extant in the state. In 1991, after a young female mountain lion was shot near Golva, mountain lions were classified as a “fur-bearer” in the state (North Dakota Century Code 20.1-01). Provisions were made to allow removal of individual mountain lions for protection of property (e.g. livestock) and human safety concerns (North Dakota Century Code 20.1-07-04). Prior to this time, mountain lions were unprotected and could be killed legally (McKenna et al. 2004). By the early-2000s, the number of reports of mountain lion occurrences documented by the North Dakota Game and Fish Department (NDGFD) had increased such that it became apparent there was a continued presence of mountain lions in western North Dakota (NDGFD 2006).

Currently, it is recognized that there is a relatively small population of mountain lions occurring in western North Dakota. Occasionally, individual mountain lions are documented in other parts of the state (McKenna et al. 2004, NDGFD 2006, NDGFD 2007). As expected, initial estimates of habitat suitability indicated that the Badlands, Missouri River Breaks, and Killdeer Mountains regions (comprising 6% of total state area) provide suitable habitat for mountain lions (NDGFD 2006).

The first regulated harvest season for mountain lions in North Dakota occurred in 2005-2006 with a quota 5. This first harvest season was considered experimental with the goal being to acquire biological and distributional information about the population of mountain lions occurring in the state (NDGFD 2006). The second regulated harvest season (2006-2007) was modified to prohibit the harvest of kittens (i.e. mountain lions with visible spots) or females accompanied by kittens. Additionally, harvesters were not allowed to use dogs to pursue mountain lions until later in the season. Changes to the 2007-2008 regulations included dividing the state into 2 management zones (Figure 1; Zone 1 had a quota of 5, Zone 2 had no quota), no longer including incidental or depredation removals in the quota, and Fort Berthold Reservation (Reservation) having a separate harvest quota of 5 mountain lions. During the 2008-2009 harvest season, the harvest quota for mountain lions in Zone 1 was increased to 8 while the quota within the Reservation remained 5. The harvest quota in Zone 1 was again increased to 10 in the 2010-2011 harvest season.

METHODS

Reports of mountain lion occurrence (e.g. sightings, tracks, etc.) were recorded by NDGFD personnel, and included reports from the general public, deer hunters, fur hunters and trappers, United States Department of Agriculture-Wildlife Services, Theodore Roosevelt National Park, and Reservation Fish and Game employees (Figure 2). Reports were classified as

- a. Verified – Evidence available, including a carcass or live-captured mountain lion, photograph or video, DNA analysis results, or tracks, scat, kill or attack confirmed as being that of a mountain lion by a qualified wildlife professional.
- b. Probable Unverified – No evidence available, but report, animal description, and/or location are plausible.
- c. Improbable Unverified – No evidence available and report, animal description, and/or location are not plausible.
- d. Unfounded – Evidence available which disproves the claim that it is a mountain lion, including carcass or live-captured animal, photograph or video, DNA analysis results, or tracks, scat, kill or attack disproved as being that of a mountain lion by a qualified wildlife professional.

We required a mandatory check-in of intact carcasses for all harvested mountain lions. Additionally, we collected data from mountain lions killed on the Reservation. From the mountain lion carcasses, we estimated age (Anderson and Lindzey 2000) and collected morphological measurements, reproductive tracts, stomachs, and tissue samples. We examined reproductive tracts for placental scars. We extracted an upper premolar and sent them to Matson's Laboratory (Milltown, Montana, USA) to confirm age via counts of cementum annuli. Tissue samples from all mountain lion carcasses were sent to the Genetics Laboratory at the United States Forest Service Rocky Mountain Research Station (Missoula, Montana, USA) for analyses.

We mailed a questionnaire to 5,000 individuals in early-April who bought either a furbearer or combination license for the 2010-2011 harvest season (Tucker 2011). We asked hunters and trappers to indicate amount of time spent pursuing mountain lions and number of individual mountain lions harvested. From this, we estimated mean number of days, number of total mountain lions harvested, and counties of most hunting activity.

While surveying a random sample of hunters from the 2011 deer hunting season (Jensen et al. 2011), we asked hunters if they saw any mountain lions while hunting deer. We summarized visual observations of mountain lions by deer hunting unit.

Although no formal research project has been initiated, on 26 November 2006 an incidentally-trapped male mountain lion (M12) was released after fitting it with a VHF radio-collar. This was the first mountain lion radio-collared in the state by the NDGFD. On 1 April 2009, we recaptured M12 for a third time and replaced his radio collar with one equipped with a real-time GPS mechanism (Globalstar D-cell model; North Star Science and Technology, King George, Virginia, USA). The GPS collar was programmed to collect a location 3 times per 24-hour

period, which gives us the ability to investigate location clusters and identify kill sites and prey species (Anderson and Lindzey 2003). On 3 January 2010, the GPS mechanism quit functioning on M12's collar. The last time we acquired a relocation from the VHF beacon on M12's radio collar was 4 June 2010, after which we were unable to locate him. On 28 April 2011, M12 was captured on a trail camera photo confirming that he is still alive, but that his radio collar simply is not functioning.

During April-June 2011 we attempted to live-capture additional mountain lions in McKenzie County to fit them with radio collars. Our goals were to continue collecting baseline data on survival, home range area, habitat use, movements, and food habits of mountain lions in North Dakota. We primarily used foothold traps and foot snares with draw baits (e.g. deer carcasses) to live-capture mountain lions. We inspected active traps every 24-hour period.

RESULTS

From 1 July 2010-30 June 2011, we recorded 116 reports of mountain lions (Figures 2-3). Of those, 39 reports (34%) were classified as Verified (Table 1, Figures 4-5). The Verified reports consisted of 56% carcasses (i.e. mountain lions harvested during the regulated hunting season, dispatched for protection of property, or incidentally trapped), 36% mountain lion signs (i.e. tracks, scat, kills, or scrapes), and 8% photographs or videos (Table 2). Similar to the past several years, the distribution of Verified mountain lion reports occurred predominantly in western North Dakota, particularly the Badlands region and surrounding area (Figures 4-5).

The harvest season for mountain lions opened on 3 September 2010. Zone 1 had a quota of 10 mountain lions, whereas Zone 2 had no quota and remained open for hunting until 31 March 2011 (Figure 5). In Zone 1, the harvest season closed after the 10th mountain lion was harvested on 12 November 2010 (Table 3). Additionally, one mountain lion was harvested in Zone 2 and two mountain lions were harvested within the Reservation. The total harvest consisted of 7 females and 6 males. Methods of take included 10 shot with firearms, 2 pursued with dogs and shot with firearms, and 1 called in using a predator call and shot with a firearm. Additionally, 8 mountain lions (3 females, 5 males) were dispatched for protection of property (e.g. livestock) and 1 female mountain lion was incidentally trapped in a foothold and then shot by the landowner who discovered it in the trap.

Majority of mountain lion carcasses we examined were in good nutritional condition; fat content was at or above expected levels and parasite loads were low. Gross physical injuries included F53 missing half of tail, M61 missing lower half of left hind leg, F62 had frostbit left ear and a tear on right ear, M65 had frostbit ears and tip of tail, and M70 had scars on right ear. F63 (harvested in Zone 2) was a young female mountain lion that was severely emaciated. A local farmer discovered F63 in his shed, after which the farmer and his son dispatched F63 because the mountain lion would not leave the shed. During necropsy, we discovered F63 had several broken teeth, including at least 2 canines with exposed roots. The damage to F63's teeth had occurred several weeks prior to death and may have contributed to the emaciated body condition.

Currently, 57 individual mountain lions tissue samples have been analyzed using microsatellite loci (Pilgrim and Schwartz 2011). Analyses concerning population structure, size, and connectivity are still underway. However, specific relatedness inquiries are available, indicating that there were fewer direct relationships (i.e. parent/offspring or sibling relationships were not found) than we expected.

Results from the questionnaire mailed to furbearer and combination license holders indicated that 3.1% of license holders hunted mountain lions during the 2010-2011 season. Results from the questionnaire also indicated that individual hunters spent an average of 11.9 ± 19.2 ($\bar{x} \pm SD$) days pursuing mountain lions with an estimated statewide harvest of 1 mountain lion during the 2010-2011 hunting season. Counties of most hunting activity were McKenzie, Billings, and Mountrail.

Responses from the deer hunter questionnaire resulted in <1% of people indicating they saw a mountain lion while deer hunting (Figure 6). Hunters reported seeing a mountain lion in 16 hunting units across the state (Figure 6). Of those units, 5 (3A3, 4A, 4B, 4C, and 4E) contained habitat considered suitable for a breeding population of mountain lions (NDGFD 2006). Only 2 of the units (3A3 and 4B) also had sighting of a mountain lion during the previous year survey.

We set 65 trap sites (e.g. draw baits) for mountain lion in McKenzie County during March-June 2011. We spent 43 days afield and accrued approximately 12,000 and 995 miles on a pick-up and ATV, respectively. During that time, one mountain lion (M12) was captured and temporarily held in a foothold trap (#7 double longspring, Livestock Protection Company, Alpine, Texas, USA). However, the mountain lion pulled out of the foothold trap prior to the morning trap check. We were unable to live-capture any other mountain lions, hence we did not deploy additional radio collars.

DISCUSSION

We monitored mountain lions in North Dakota via reports of occurrence, mandatory carcass check-ins, and harvest surveys. Additionally, we have begun collecting preliminary information on mountain lions via radiotelemetry. Our knowledge of mountain lion distribution and population demographics and health has vastly improved over the past 6 years. However, we are continuing to improve our understanding of vital rates, habitat use, and appropriate survey techniques for mountain lions in North Dakota. Therefore, until more information is known, mountain lions should continue to be monitored closely.

Although we cannot use Verified reports of mountain lion occurrence to document population trends, these reports provide us with valuable information regarding distribution, habitat use, and travel routes of mountain lions in North Dakota. We documented reports of mountain lion occurrence in 51% of the counties in North Dakota (Figure 2). However, we verified reports in only 13% of counties (Figure 4). Not surprisingly, we verified the largest number of reports in Dunn ($n = 26$) and McKenzie ($n = 6$) counties, which have the highest proportion of suitable

habitat for mountain lions (NDGFD 2006). However, the number of reports of mountain lion occurrence we documented from 1 July 2010-30 June 2011 was 13% less than the previous fiscal year (Table 1, Figure 3). This is likely the result of a habituation of residents and loss of novelty regarding the presence of mountain lions in the state. This idea is further supported by a low proportion of reports coming from counties where mountain lions are known to occur, but a continued high proportion of reports coming from counties where mountain lions are not likely to be established.

We also continued to receive a large number of reports from Burleigh and Ward counties, which contain the cities of Bismarck and Minot, respectively (Figure 2). We were more likely to investigate reports of mountain lion occurrence within these municipalities due to human safety concerns and availability of staff. Only 1 (2.6%) of these reports was classified as Verified. On 18 December 2010, a mountain lion (M64) was shot for protection of livestock approximately 10 miles south of Bismarck along the Missouri River. M64 was a young male mountain lion of dispersal age, and the Missouri River is a well-known travel corridor for dispersing wildlife. In contrast, a majority of reports (59%) in Burleigh and Ward counties were Unfounded (i.e. Verified as being something other than a mountain lion). The most common animals that were mistakenly identified as mountain lions were domestic dogs (*Canis familiaris*), especially their tracks, and domestic cats (*Felis catus*).

External and internal examination of mountain lions legally harvested or dispatched for protection of property indicated mountain lions in North Dakota are generally healthy. The sex ratio of mountain lions we examined was 1.1 female per male and mean age was 2.1 ± 2.5 ($\bar{x} \pm$ SD) years. Considering all mountain lion carcasses we have examined to date in North Dakota ($n = 84$), mean weight for mountain lions ≥ 1 year of age was 85 (range 58, 126) and 116 (range 84, 170) pounds for females and males, respectively.

We spent an extensive amount of time scouting for and attempting to live-capture mountain lions in McKenzie County in spring and early-summer. The amount of mountain lion sign (e.g. tracks, scats, and scrapes) found indicated mountain lions in the North Dakota Badlands are at densities expected for large, territorial carnivores.

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Table 1. Number of mountain lion reports recorded by classification in North Dakota, 1 January 2004 through 30 June 2011.

Year ^a	Verified ^a	Probable Unverified ^b	Improbable Unverified ^c	Unfounded ^d	Total
2004	12	25	32	5	74
2005	39	89	52	43	223
2006	41	84	57	62	244
2007	69	66	37	55	227
2008	43	52	49	82	226
2009	26	22	32	51	131
2010	18	16	31	55	120
2011	23	5	8	17	53

^aMost recent year only includes reports through 30 June.

^bEvidence available, including a carcass or live-captured mountain lion, photograph or video, DNA analysis results, or tracks, scat, kill or attack confirmed as being that of a mountain lion by a qualified wildlife professional.

^cNo evidence available and the report, animal description, and/or location are plausible.

^dNo evidence available and the report, animal description, and/or location are not plausible.

^eEvidence available which disproves the claim that it is a mountain lion, including carcass or live-captured animal, photograph or video, DNA analysis results, or tracks, scat, kill or attack disproved as being that of a mountain lion by a qualified wildlife professional.

Table 2. Reports of Verified mountain lion occurrence in North Dakota, 2004-2011.

Year ^a	Sign	Carcass	Visual observation	Incidental capture	Radio collar ^b	Photograph/Video	Total
2004	4	2	1	0	1	4	12
2005	17	4	16	1	0	1	39
2006	26	8	5	1	0	1	41
2007	39	15	8	0	1	6	69
2008	22	11	5	0	0	5	43
2009	6	13	3	0	0	4	26
2010	3	13	1	0	0	1	18
2011	12	10	0	0	0	1	23

^aMost recent year only includes reports through 30 June.

^bLocations collected via radiotelemetry as a result of research being conducted in nearby states (e.g. South Dakota).

Table 3. Mountain lion mortalities in North Dakota, 1 July 2010 through 30 June 2011.

ID	Cause of death	Date	Sex	Estimated age class (yr) ^a	Weight (lbs)	County
F53	Legal harvest (Zone 1)	9/27/2010	F	2-3	85	Dunn
M54	Legal harvest (Zone 1)	10/15/2010	M	4-5	146	McKenzie
F55	Legal harvest (Zone 1)	11/4/2010	F	3-4	78	McKenzie
M56	Legal harvest (Zone 1)	11/6/2010	M	1-2	99	Billings
F57	Legal harvest (Zone 1)	11/7/2010	F	2-3	93	Dunn
M58	Legal harvest (Zone 1)	11/10/2010	M	0-1	71	McKenzie
F59	Legal harvest (Zone 1)	11/10/2010	F	0-1	59	McKenzie
F60	Legal harvest (Zone 1)	11/11/2010	F	1-2	77	Dunn
M61	Legal harvest (Zone 1)	11/12/2010	M	1-2	90	Dunn
F62	Legal harvest (Zone 1)	11/12/2010	F	5-6	126	McKenzie
F63	Legal harvest (Zone 2)	12/4/2010	F	1-3	58	Kidder
M64	Legal shooting: Protection of property	12/18/2010	M	1-3	121	Burleigh
M65	Legal shooting: Protection of property	1/5/2011	M	1-2	95	Oliver
F66	Legal shooting: Protection of property	1/14/2011	F	3-5	104	Dunn
F67	Legal shooting: Protection of property	1/14/2011	F	0-1	40	Dunn
F68	Legal shooting: Protection of property	1/14/2011	F	0-1	40	Dunn
M69	Legal shooting: Protection of property	1/14/2011	M	0-1	40	Dunn
M70	Legal shooting: Protection of property	1/16/2011	M	0-1	60	Dunn
M71	Legal harvest (Ft. Berthold Reservation)	2/27/2011	M	3-4	130	Dunn
M72	Legal harvest (Ft. Berthold Reservation)	3/7/2011	M	0-1	70	Dunn
F73	Incidental trapping	3/14/2011	F	5-6	88	Dunn
M74	Legal shooting: Protection of property	4/22/2011	M	1-2	118	Dunn

^aWhen possible, cementum analysis (Matson's Laboratory, Milltown, Montana, USA) was used to determine age estimates. Otherwise, estimates of age followed that of Anderson and Lindzey (2000).

Figure 1. Harvest zones for mountain lions in North Dakota during the 2010-2011 season.

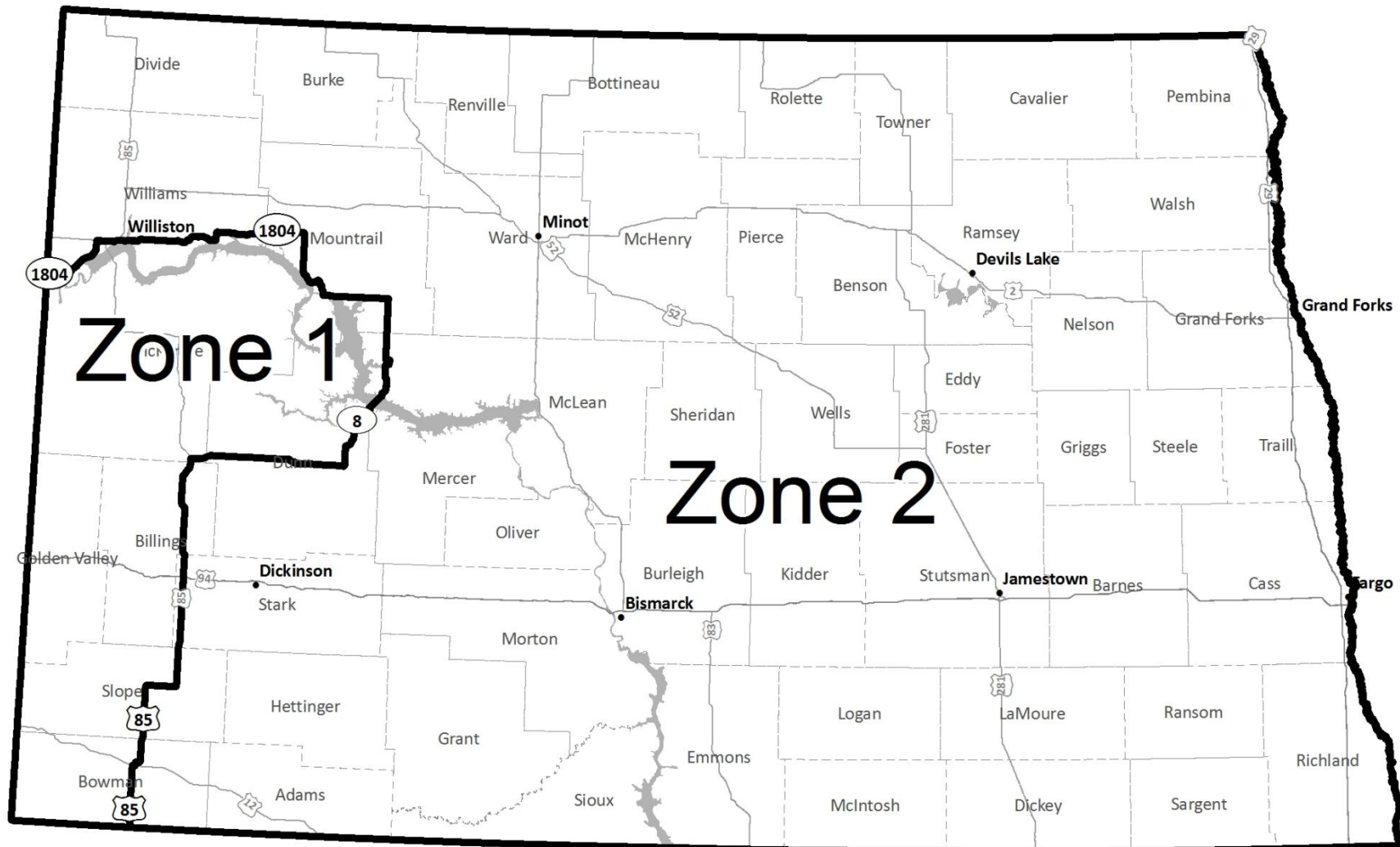


Figure 2. Number of reports of mountain lion occurrence in North Dakota, 1 July 2010 through 30 June 2011.

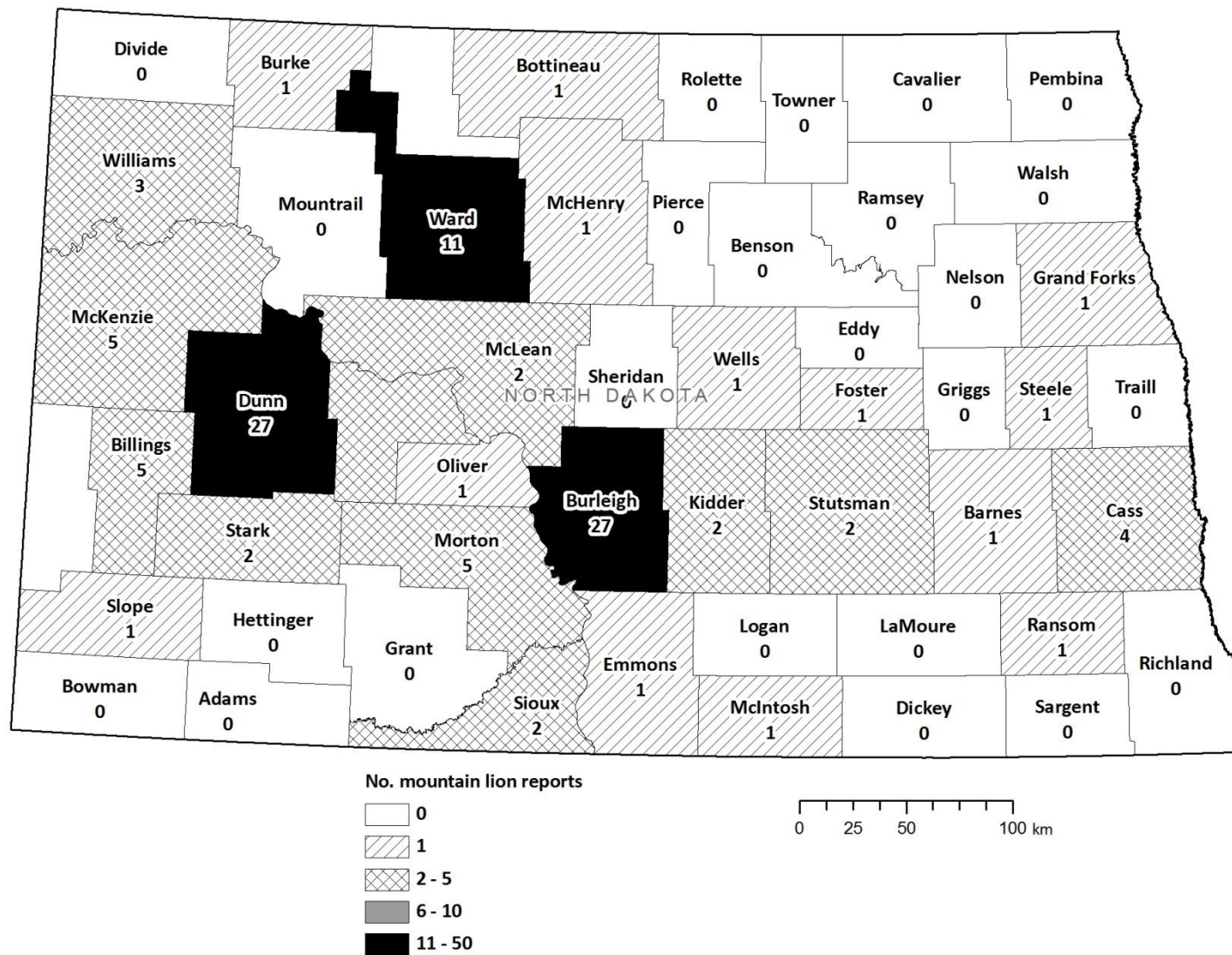


Figure 3. Number of reports of mountain lion occurrence in North Dakota, 2004-2011. Reports of occurrence were classified as Unfounded (evidence available to disprove the occurrence of a mountain lion), Unverified (no evidence available to prove or disprove the occurrence of a mountain lion), and Verified (evidence available to prove the occurrence of a mountain lion). *Note, the most recent column only includes reports through 30 June.

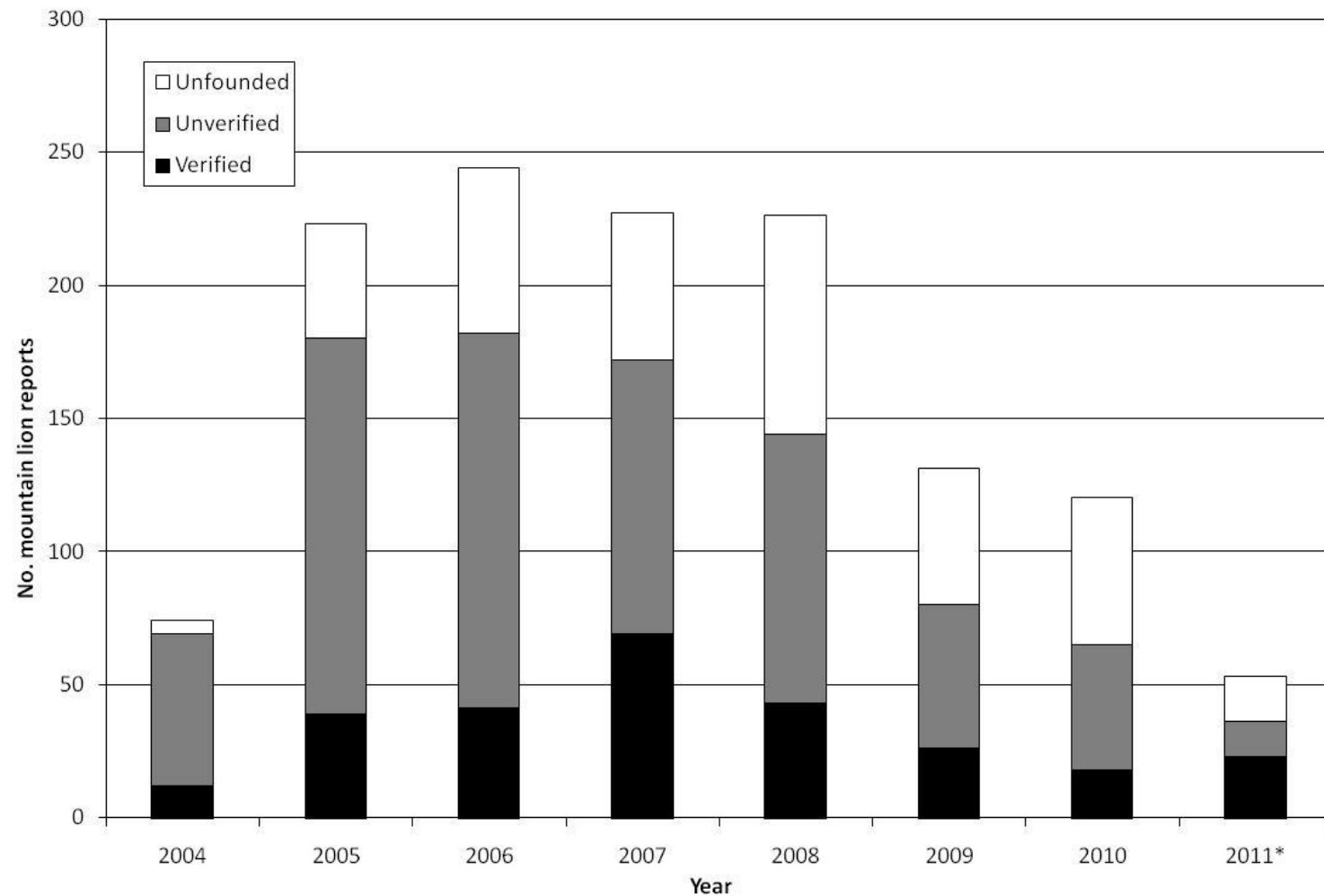


Figure 4. Locations of Verified reports of mountain lion occurrence in North Dakota, 1 July 2010 through 30 June 2011.

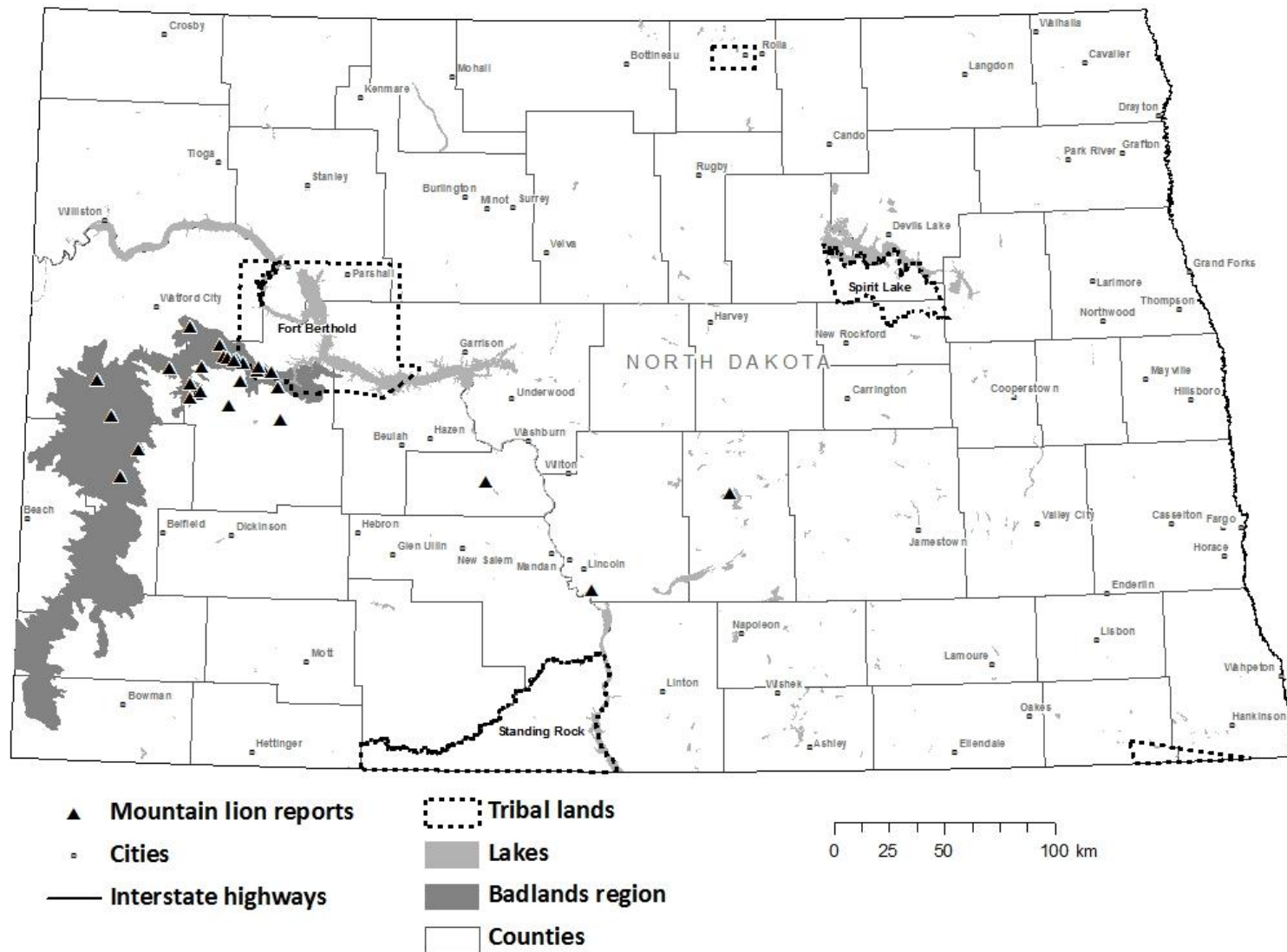


Figure 5. Location of mountain lion carcasses in North Dakota, 1 July 2010 through 30 June 2011. Mountain lions died as a result of legal harvest, incidental trapping, and protection of property.

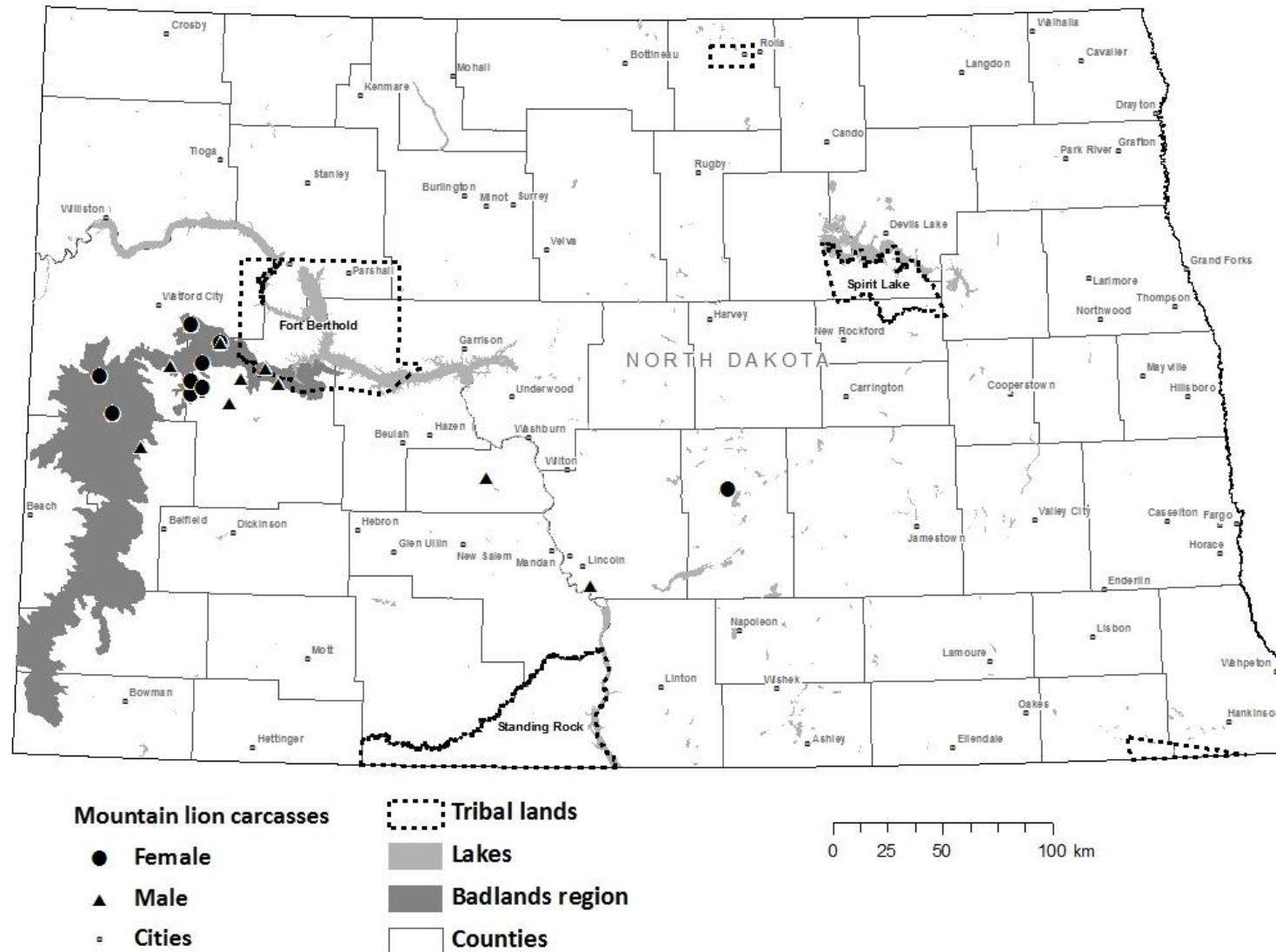


Figure 6. Deer management units were hunters reported seeing a mountain lion while deer hunting in North Dakota, 2010.

